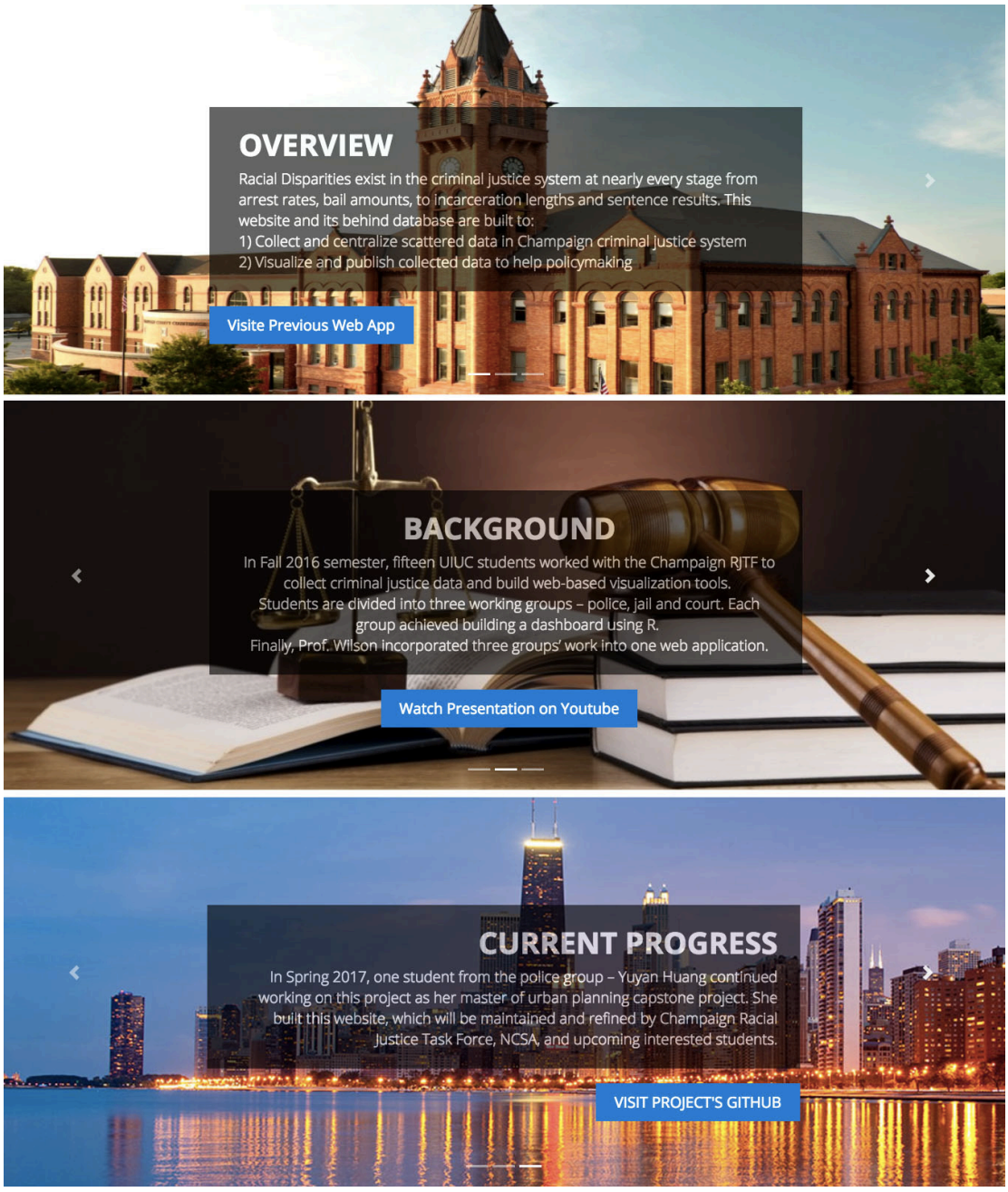
Open Data Portal for Champaign Racial and Criminal Justice

Towards Greater Transparency in Policy Making



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Abstract

This project focuses on the application of civic technology to urban planning practice in racial justice. It explores the capability of computer technology to improve the accessibility of civic data and to bring greater transparency to public decision-making. Working in collaboration with Champaign County Racial Justice Task Force, the author developed a website[1] and its behind database to support the visualization of publicly available information on arrests, correctional facility records and court cases in Urbana-Champaign.

The website and database has received positive feedback from the Task Force as it collects and centralizes data scattered in Champaign criminal justice system and responds to data needs brought forward by civil society and local government regarding law enforcement. With this tool, communities, interested social groups and individuals will have easier access to legal data and be better informed of possible racial disparities in the criminal justice system.

Project Background

Racial disparity in the criminal justice system has long been a vexing problem in the United States. Events of police shooting of unarmed African-Americans have brought this issue to the spotlight and aroused people's questioning of the ethics of police practice and the disparity toward communities of color. Studies have shown that subtle discrimination exists in the criminal justice system at nearly every stage from arrest rates, bail amounts, to sentence length and probation hearing outcomes.

Urban Planning is a discipline dedicated to enhance social equity. Exploring data in the criminal justice system and understand their implications are of great importance for planners and policy-makers to address racial disparity problems and to make better and more transparent policy decisions.

However, the lack of access to well-formatted and readable data in criminal justice system has created obstacles in this process. In Champaign County, data on police records, jail population, bond information and court cases are released by different agencies in different data formats. For example, police arrest records of Champaign City, Urbana City and the University are published on three different websites as spreadsheets with different attributes. Information on inmates who are held in one of the county's correctional facilities are scattered in daily jail log records, jail reports and an inmate lookup website. Without a comprehensive and effective database and an open data portal, it would be challenging for individuals, local groups and organizations to access and use these data to facilitate further research.

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[1] Link to the website: https://racialjustice.herokuapp.com/

This project aims to build a database and a website to centralize and visualize data scattered in Champaign criminal justice system. It is built on the foundation of a previous project collaboratively finished by fifteen UIUC students taking the course Civic technology and Digital City. Students are divided into three groups – police, correctional facility and court. Each group was responsible for collecting data in corresponding field and building visualization dashboard using shiny app framework in R. At the end of the course, Prof. Wilson incorporated three dashboards into a final one[2] and published it using a shiny server hosted on the ROGER supercomputer at UIUC.

Figure 1. A Snapshot of the "Resolution" Page of Previous Police Dashboard[3]

To make these dashboards more publicly accessible and to maintain a long-term online database, the author built a more comprehensive website and its behind database, which are currently hosted on the Heroku server. Visualization tools that are originally written in R are all rewritten using the Django web framework involving front-end programming languages, such as HTML, CSS and JavaScript and back-end programming languages, such as Python and PostgreSQL. Users can now visit the website at https://racialjustice.herokuapp.com/. All codes have been published on GitHub: https://github.com/yhung133/racial-justice-app.

[2] Link to the final dashboard: http://141.142.170.106/VizTools/
[3] Link to the police dashboard: https://yhung133.shinyapps.io/Project_Final/

End Product Overview

This website is designed to have four major components:

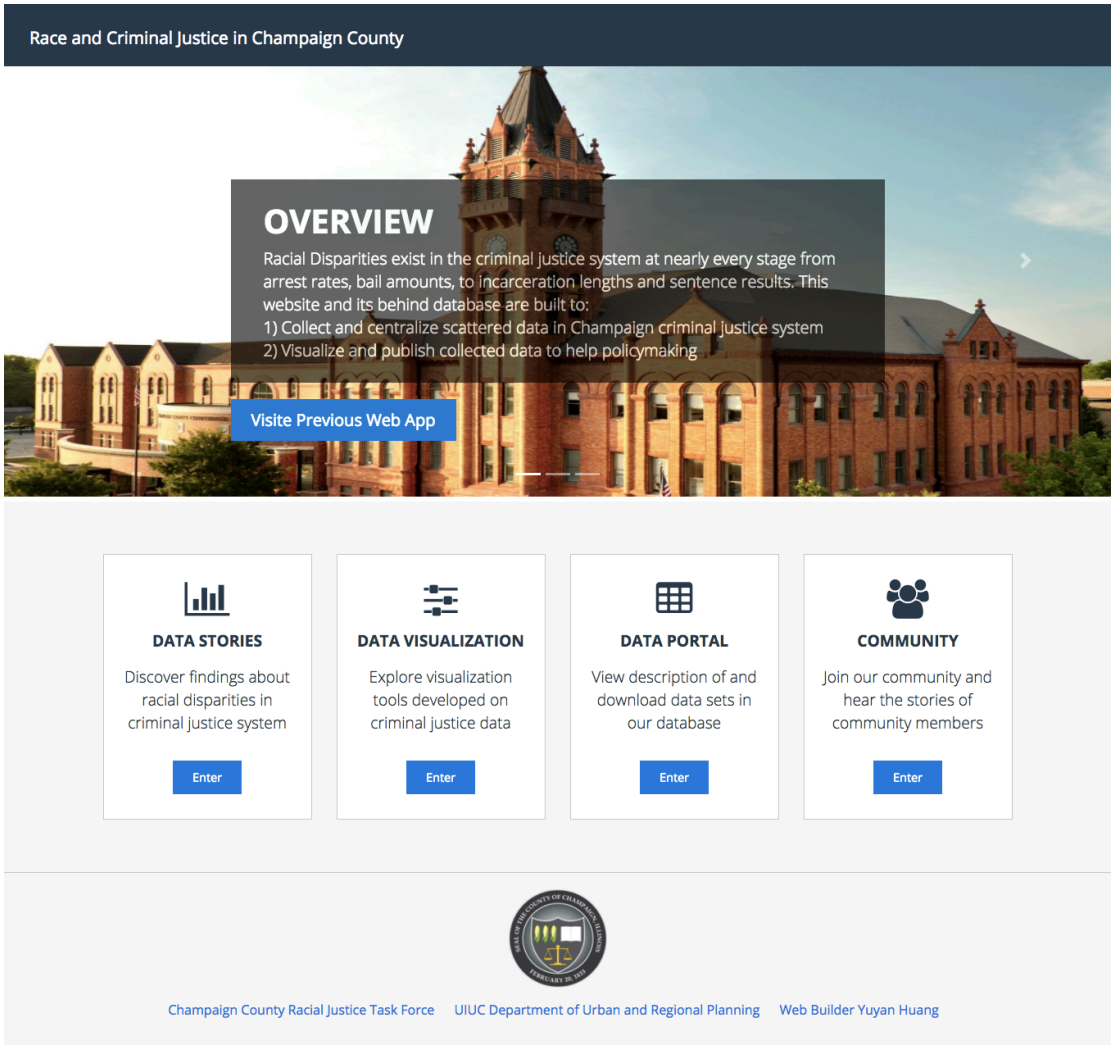

Figure 2. Landing Page of the Website Showing the Four Components

1. Data Stories

Previous visualization tools are mainly descriptive charts or tables of collected data. However, to truly address racial disparities in the criminal justice system, deeper statistical analyses are needed. In collaboration with students from the Department of Statistics at UIUC who are taking the course Statistical Consulting, this part of the website is designed to highlight statistically significant findings regarding racial disparities in a story-telling way. Students from the STAT Department are responsible for analyzing collected arrest, jail population, bond payment, and court case data using their knowledge in statistics. The author is responsible for visualizing their findings and embedding these results into the website platform.

2. Data Visualization

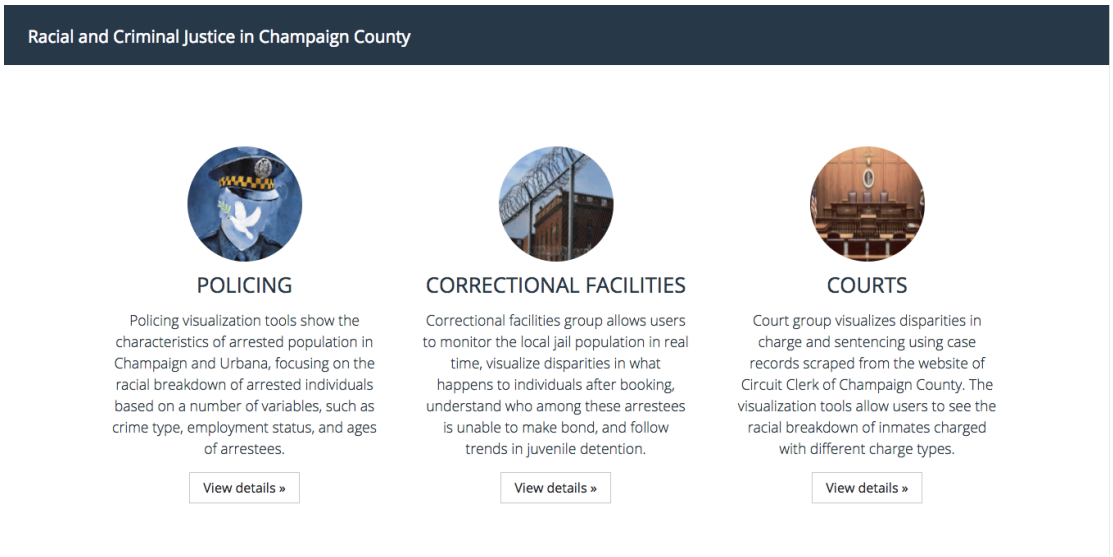

Figure 3. Summarization Webpage of Three Dashboards

Data visualization part of the website is designed to visualize datasets stored in the online database using interactive bar charts, line charts, pie charts and tables. Most visualization tools are "translated" from previous dashboards. They allow users to explore descriptive illustration of criminal justice data and have a basic understanding of trends and characteristics.

This part is further composed of three webpages corresponding to three previous dashboards (policing, correctional facilities, and courts), which are individually finished by three student groups taking the course Civic Tech and Digital City.

1) Policing

The Policing dashboard focuses on visualizing characteristics of arrested population. Collected policing data include incidents, arrests and reported crimes from each of the four police agencies that participate in the centralized police data management system including: City of Champaign, City of Urbana, U of I Police, and the Champaign County Sheriff. These data were provided by these local police agencies through a formal FOIA request. Arrests include police incidents in which an individual is charged with a violation of the law. This means the arrest data includes data for individuals who were issued citations and traffic tickets, along with individuals who were charged with more serious crimes.

2) Correctional Facilities

This dashboard visualizes data about in-jail population. The correctional facilities working group collected demographic information as well as legal data (e.g. bonds, charges, court dates, release dates, etc.) on inmates who were held in

one of the county's facilities beginning January 1, 2010 until September of 2016 (i.e., the date of the requests). They visualize the racial breakdown of population in correctional facilities in Champaign County and provide real-time numbers and interactive charts that allows users to have easier access to legal data on inmates who were held in one of the county facilities and to get more insights on racial disparity in criminal justice system.

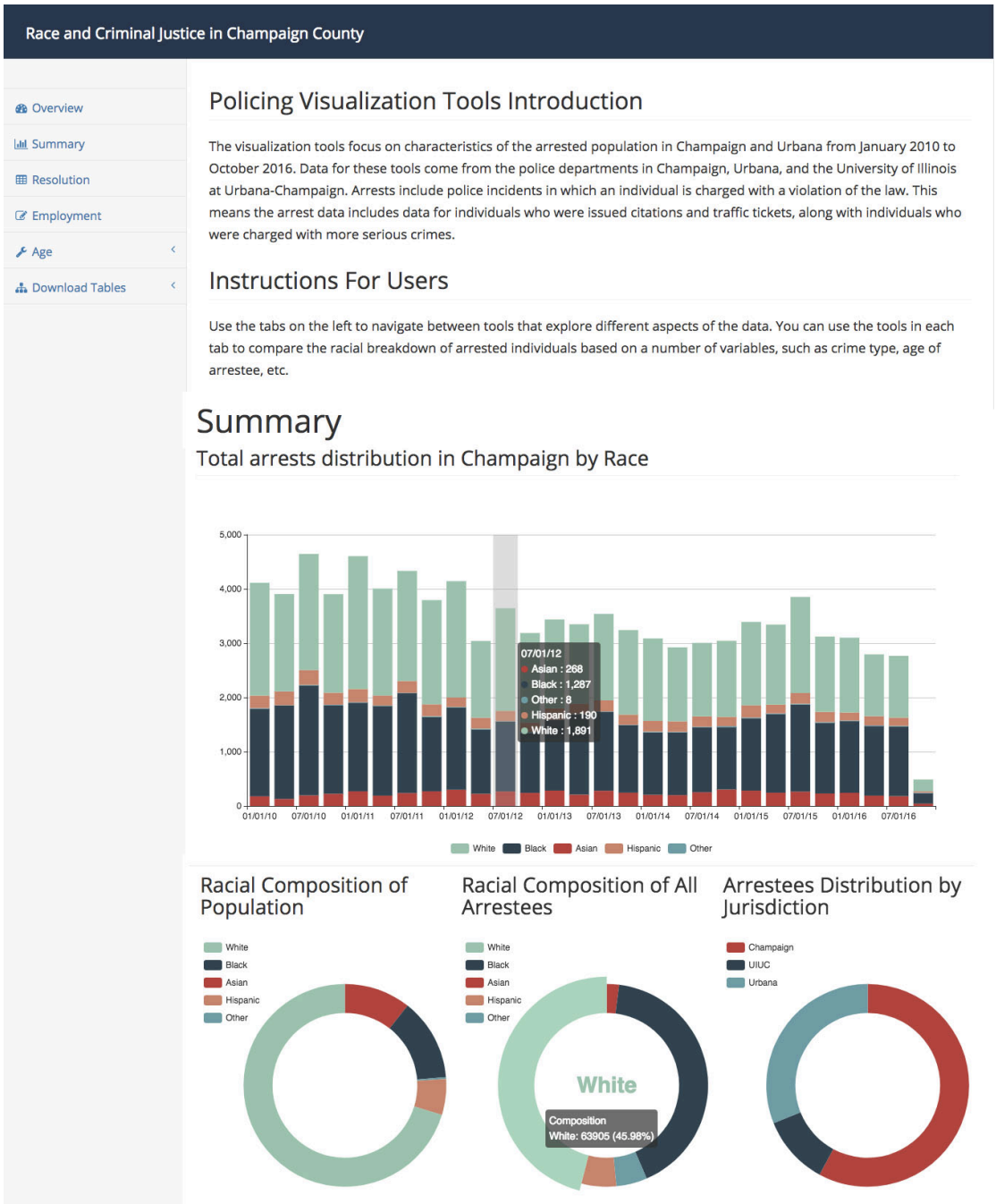

Figure 4. Snapshot of Part of The Policing Dashboard Webpage

3) Court

The court group works on court case records from Circuit Clerk of Champaign

County. Since the FOIA request asking for records provided in the clerk's online public access system hasn't been responded, this group developed a series of scripts to 'scrape' the desired information from the Circuit Clerk of Champaign County website as a temporary work-around in hopes that the requested data will be provided at a future date. The court group visualizes disparities in charges and sentencing.

3. Data Portal

The Data Portal part is designed to show a list of data tables archived in the database. Each table comes with a brief description of its source and specific attributes. This part allows users to view formatted data tables that support the visualization tools and download these datasets for further research use.

4. Community

Local community engagement is an essential part in the implementation of urban planning practices. Quantitative data, such as charts and tables, are not enough to arouse attention of potential racial disparities in local criminal justice system and to promote corresponding public policy making. To supplement collected quantitative data, the Champaign Racial Justice Task Force proposed to have another database collecting and archiving qualitative data, such as videos of interviews with community members sharing their stories about racial disparities, especially those related to criminal justice.

This part is also designed to allow website users to register their account and make relevant postings on the online discussion forum.

Database, Data Description and Sources

A database is a collection of information that is organized so that it can be easily accessed, managed and updated[4]. There are generally two types of database – relational database and non-relational database. A relational database is a collection of data items organized as a set of formally described tables from which data can be accessed ore reassembled without changing the pre-defined schema of tables[5]. The programming language to interact with a relational database is the structured query language (SQL).

There are two major advantages of storing data tables into a SQL database compared to just saving them in Excel spreadsheet or CSV format: 1) tables are better formatted so it can be easily expanded and maintained in the long term; 2) data stored in a relational database can be quickly accessed when drawing an interactive charts using the SQL programming language.

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[4] What is database (DB)? - Definition from WhatIs.com. (n.d.). Retrieved August 04, 2017, from http://searchsqlserver.techtarget.com/definition/database

[5] What is relational database? - Definition from WhatIs.com. (n.d.). Retrieved August 04, 2017, from http://searchsqlserver.techtarget.com/definition/relational-database

Previously, when we were building the dashboards using Shiny App framework in R, all tables were saved in a SQLite database. SQLite is an in-process library that implements a self-contained, server-less, zero-configuration, and transactional SQL database engine[6]. However, SQLite is not comparable to client/server SQL database engines such as MySQL, Oracle, PostgreSQL, or SQL Server. Client/server SQL database engines strive to implement a shared repository of enterprise data. They emphasize scalability, concurrency, centralization, and control. SQLite strives to provide local data storage for individual applications and devices. SQLite emphasizes economy, efficiency, reliability, independence, and simplicity[7].

Simply speaking, SQLite is more like a local contained storing structured data tables. But when it comes to support a website, it cannot compete with client/server databases. Therefore, the author switched to a PostgreSQL database when building the website.

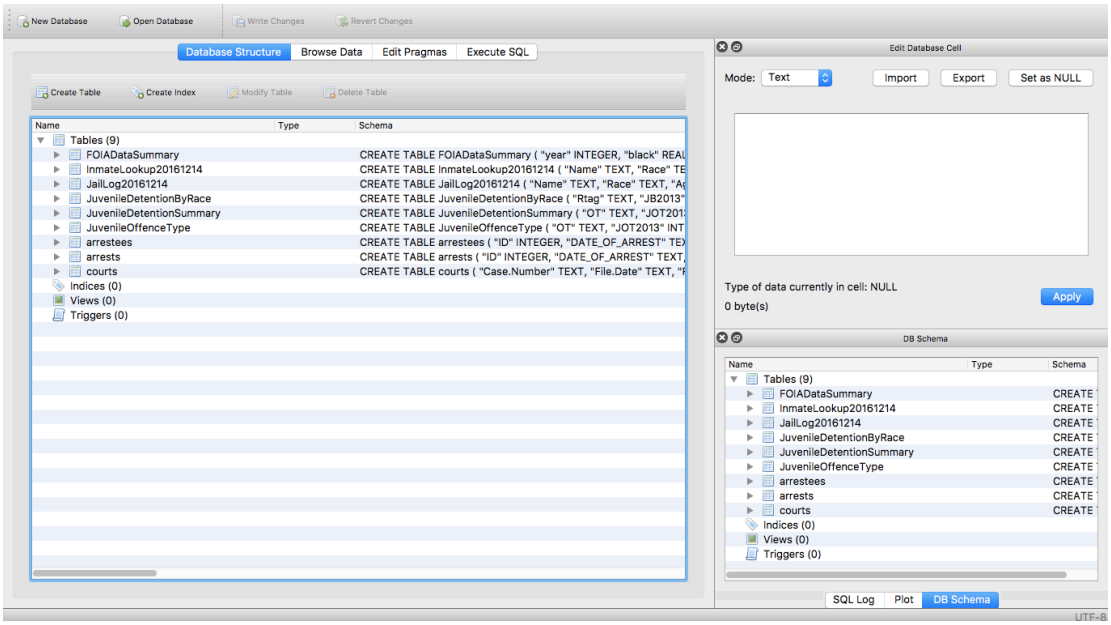

Figure 5. A Snapshot of Previous SQLite Database

Six tables are currently stored in the PostgreSQL database, with one table covering police arrest records, four tables covering in-jail population characteristics as well as bond payment information, and another table covering court case records. Some of these tables come from FOIA (Freedom of Information Act) requests. Others are scraped from publicly accessible government websites. More detailed information about each table is showed as follows:

	Table Information	**Table Attributes**	**Table Source**

[6] About SQLite. (n.d.). Retrieved August 04, 2017, from https://www.sqlite.org/about.html
[7] Appropriate Uses For SQLite. (n.d.). Retrieved August 04, 2017, from https://sqlite.org/whentouse.html

Police	Arrest Records	ID, Date of Arrest, Time of Arrest, Arrest Code, Location of Arrest, Crime Code, Crime Code Description, Crime Code Category Weapon Code 1, Weapon Code 2, Weapon Code 3, Race Description, Sex Description, Age at Arrest, Employment Code, Arresting Officer Badge Number, Result, Police Department, More than one charge, MVO (dummy variable if one of the charges is Motor Vehicle Offence)	FOIA Request Submitted on 11/17/2016
Jail	Inmate Look Up	Name, Booked Data, Booked Time, Age, Race, Address, Bond, Charges, Court Type, Court Date	Champaign County Sherif Office Inmate Lookup System http://www1.co.champaign.il.us/SHERIFF/InmateLookUp.php
	Inmate Records	Booked Date, Booked Time, DOB, Age, Gender, Race, (Number, Direction, Street, Suffix, City, State, Zip Code, Statue #), Description, Court Date, Release Date, Bond Amount	FOIA Request Submitted on 11/17/2016
	Daily Jail Log	Name, Race, Age, Sex, Agency, Book Date, Book Time, Jacket No., Report No., Charges, (Book N Release, Release on Recognizance (Personal or CCSO), Bond paid, Served Sentence, Release, Entry No., Number of Charges), (City Ordinance Violation, Driving on Suspended or Revoked License, Failure to Appear, Resist or Obstructing a Peace Officer, Domestic Battery, Other Battery, Charges)	Originally released by Champaign County Sherif Office Website http://www.co.champaign.il.us/Sheriff/DailyReports.php Collected and processed by NCSA at UIUC http://dart.ncsa.uiuc.edu/stuffed/bpnj/daily_jail_log/
	Daily Jail Arraignment	Name, Jacket #, Court Docket Number, Report Number, Booked Date, Booked Time, Charges	Released by Champaign County Sherif Office Website http://www.co.champaign.il.us/Sherif

			f/DailyReports.php
Court	Court Case Records	Case Number, File Date, Race, Sex, Age, Charge Type (DUI class A, Felony Class 1, Felony Class 2, Felony Class 3, Felony Class 4, … Misdemeanor Class 4, Misdemeanor Class A, …), Charge Agency, Charges, Disposition Type, Defendant. Plea, Sentence Date, Sentence.	Released by Champaign Circuit Clerk Website http://www.cccircuitclerk.com/

Table 1. Summarization of Collected Data Tables

Technical Procedure

1) Front-end Programming – HTML, CSS and JavaScript

The "front-end" of a website simply means the part of a website a user can see and interact with. Every webpage a user see is a combination of HTML, CSS and JavaScript, which are all being controlled by the web browser, such as Chrome or Safari, of the user's computer

HTML (Hypertext Markup Language) is the most basic building block of the Web. It defines the content of a webpage[8]. CSS is used to stylize the appearance and presentation of HTML elements. JavaScript is used to add functionality to HTML elements, making a webpage interactive.

For this project, each webpage is written in one HTML document. Most of the CSS stylized elements are inherited from Bootstrap – a popular framework used to build responsive, mobile-first projects on the web[9].

2) Back-end Programming – Python, Django Web Framework, PostgreSQL

The back end of a website consists of a server, an application and a database, which support the functionality of the front-end. For this project, the author used the Django Web Framework to develop the whole application. Django is a high-level Python Web framework that encourages rapid development and clean, pragmatic design10. As for the database, PostgreSQL is selected because it is a free add-on provided by Heroku.

3) Deployment on Heroku

Heroku is a free cloud platform that lets developers build, deliver, monitor and

[8] HTML. (n.d.). Retrieved August 04, 2017, from https://developer.mozilla.org/en-US/docs/Web/HTML
[9] Mark Otto, Jacob Thornton, and Bootstrap contributors. (n.d.). Bootstrap. Retrieved August 04, 2017, from https://v4-alpha.getbootstrap.com/
[10] Django. (n.d.). Retrieved August 04, 2017, from https://www.djangoproject.com/

scale apps[11]. Heroku helps developers saving tons of time needed to deal with hundreds of cloud infrastructure deployment scripts or racking servers to scale. Besides, Heroku provides secure and scalable database, such as PostgreSQL, to support its hosted application.

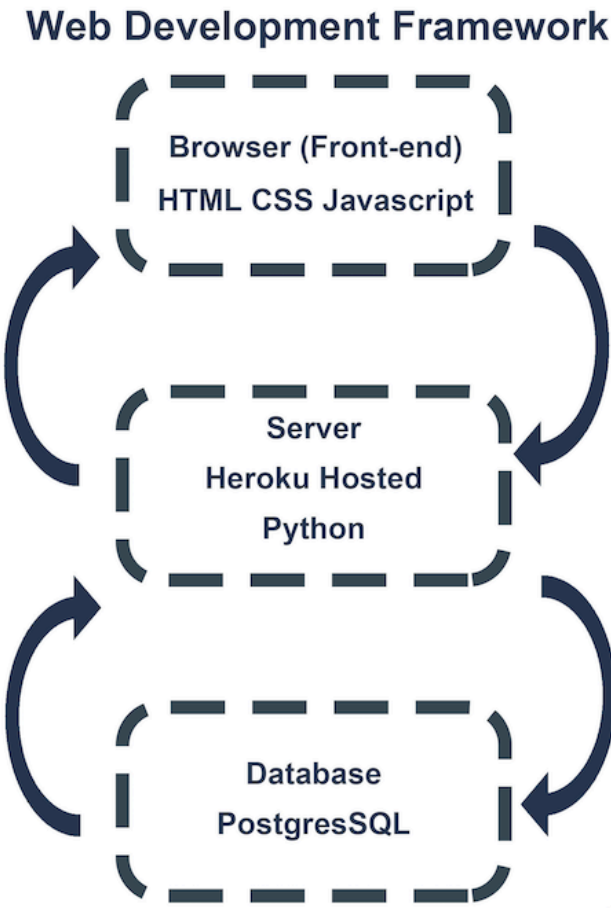

Figure 6. A Simple Illustration of the Whole Web Development Framework

Future Work

1. Further Collaboration with STAT Students

As is mentioned above, to truly address racial disparities in Champaign criminal justice system, statistical analyses of collected data are necessary. Student taking the course Statistical Consulting were trying to answer the following questions:

- What is the proportion of arrestees under different demographic factors compared to census data?
- Given that someone is already arrested, is race a significant factor that would influence the out come of whether an arrestee would be taken to jail?
- Are the waiting time, release time, and bond amount different for people who are booked due to race?

[11] What is Heroku? (n.d.). Retrieved August 04, 2017, from https://www.heroku.com/what

- Are African Americans charged with felonies more likely to be imprisoned?
- Is there a significant difference between the lengths of jail time due to race?

However, due to the limitation of collected data, most of the answers turn out to be statistically insignificant, indicating there are no significant racial disparities in the criminal justice system, which is in contradictory with the some facts we observed. To solve these contradictories, we need to collect better-formatted data and doing more statistical analyses.

2. Database expansion and maintenance

Currently the database can only be periodically updated manually since some data can only be collected from FOIA requests, of which the response and the time of response cannot be guaranteed. In the further, to facilitate the automatic update of the database, the author has to further collaborate with the Racial Justice Task Force to find out a more standard procedure to collect relevant data.

3. Refinement of Descriptive Visualization Tools

Some of the current visualization tools need to be refined to have a clearer presentation of descriptive characteristics of collected data. For example, in one chart of the jail dashboard, the racial composition of different results (including: Bail Paid", "Book N Release", "Release on Recognizance" and "Still in Jail at the End Day of Booking") for inmates at the end of the booking day is misleading. This chart didn't specify crime types the inmates have conducted. However, results are heavily influenced by the crimes types instead of just influenced by races. To get rid of these misleading charts, such visualization tools have to be refined.

4. Development of the Video Platform

Local community engagement is critical in the enforcement of planning practices. To arouse the local community's attention of potential racial disparity in the criminal justice system, Carolyn Randolph, a member of the Racial Justice Task Force, proposed to have another database archiving video interviews with local residents who have experienced racial disparities in the legal process. Carolyn Randolph, as a PHD in sociology would lead a team to prepare and finish the recording of video interviews, while the author would be responsible to build the video database and present videos on the website.

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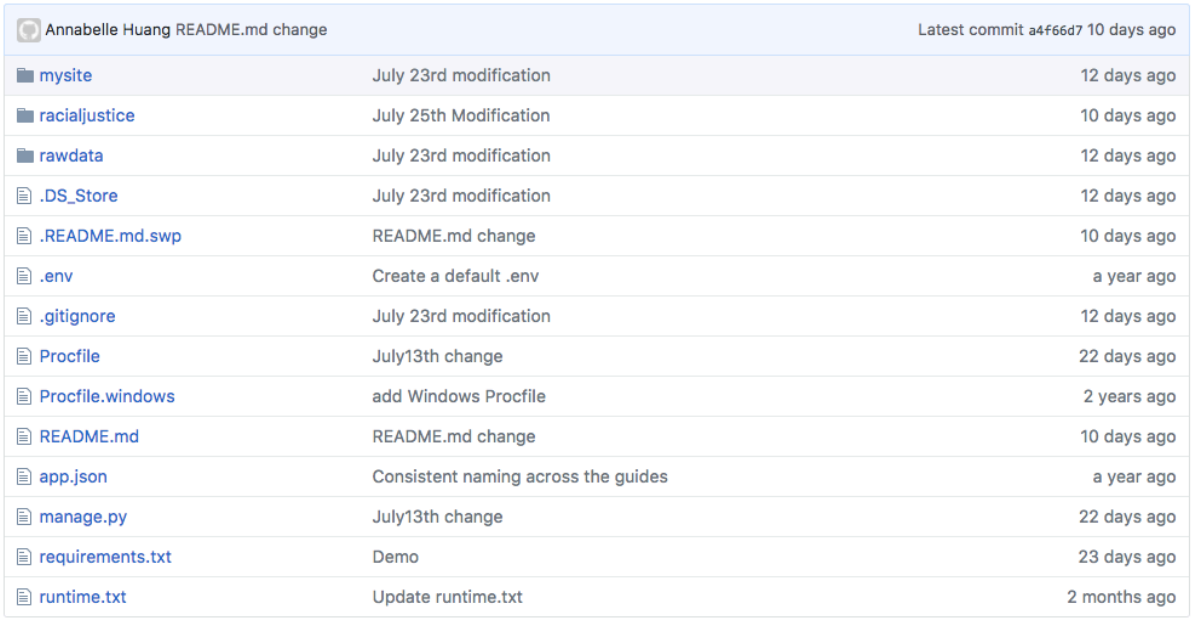
Appendices



Annabelle Huang README.md change		Latest commit a4f66d7 10 days ago
mysite	July 23rd modification	12 days ago
racialjustice	July 25th Modification	10 days ago
rawdata	July 23rd modification	12 days ago
.DS_Store	July 23rd modification	12 days ago
.README.md.swp	README.md change	10 days ago
.env	Create a default .env	a year ago
.gitignore	July 23rd modification	12 days ago
Procfile	July13th change	22 days ago
Procfile.windows	add Windows Procfile	2 years ago
README.md	README.md change	10 days ago
app.json	Consistent naming across the guides	a year ago
manage.py	July13th change	22 days ago
requirements.txt	Demo	23 days ago
runtime.txt	Update runtime.txt	2 months ago

Figure 7. Snapshot of the Project's GitHub Repository

Figure 8. Snapshot of the Project's Development Environment